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AUTHOR Mathis, Philip M.
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ABSTRACT

This document discusses enrollment in science education at the elementary, secondary, and college levels, and reviews the need to advertise to improve the image of science and aid in its acceptance as a curricular offering. Eight specific recommendations are offered. (SL)

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THE MARKETING OF SCIENCE AS A SCHOOL SUBJECT

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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by

Philip M. Mathis
Department of Biology
Middle Tennessee State University
Murfreesboro, Tennessee 37132

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INTRODUCTION

An increasing number of students, educational leaders, and government officials are coming to regard present-day education in science as being largely irrelevant to the chief activities of contemporary human life and are, therefore, beginning to question its educational value.[1,2] This trend is accented by the fact that, after several decades of relative growth, science course enrollments are on the decline.[3]

The factors responsible for the relative decline in science enrollments and the increasingly skeptical attitude of many regarding the value of science education are as yet unidentified, but are, undoubtedly, numerous and interactive. One might speculate that, after enjoying the limelight in the 1960's, science education is suffering from a sort of "backlash." Or, one might speculate that it is being adversely affected by the trend toward curricular diversification. Statistics show that although public secondary school offerings have increased greatly during the past few decades, the average number of courses taken increased only from 6.2 subjects per student in 1948 to 6.7 subjects per student in 1972.[4]

Another possibility is that the recent introduction and/or increased emphasis on career education, economic

education, and vocational education has been to divert attention and support away from existing programs, such as science, and to heighten the keen competition for instructional time which has long existed among various areas of knowledge. It may be that the more recent "back-to-basics" movement has adversely affected science education. Some individuals would contend, and I would agree, that this movement is too recent to have had any appreciable impact on science enrollments or attitudes toward science curricula. Nevertheless, this movement should be recognized as a potential threat to existing programs, including science.

At this point one might logically ask: "Are present-day trends in education only temporary phenomena?" "Will they endure for a while and afterwards be replaced by newer trends?" "Will science education retain its present status in the curriculum?" "Will it reassume the high status of the 1960's and again be recognized as being of vital national importance?" "Or, will it, like religious education and Latin be relegated to curricular obscurity?"

I contend that there is more than a slight chance that science will, in fact, be relegated to curricular obscurity unless urgent attention is given to the problem of marketing, or selling, science as a school subject.

SCIENCE EDUCATION AND BUSINESS: AN ANALOGY

The lifeblood of any successful business enterprise is the selling of goods and/or services. Two of the major

factors in determining sales volume are advertising and product quality.

Advertising

If science education is viewed as a business enterprise specializing in a type of educational service, and if advertisement and product quality are recognized as major determinants of sales, then, it becomes evident that in order for enrollment in science (sales) to remain stable, or to grow, proper attention must be given to the problems of advertising and improvement of quality of service.

We are all familiar with advertising that takes the form of a rationale, or justification, for buying one service or product over another. Such advertisements have evolved in education as a result of the competition that exists among various subject areas for a place in the curriculum. Historically, such "advertisements" have been disseminated through the reports of special committees, the position statements of professional scientific and teacher organizations, and through the introductory remarks included in textbooks and other curriculum materials. These advertisements are worded for maximum consumer appeal. Since consumer needs and desires change from time to time, such advertisements are subject to periodic modifications; the modifications depending usually upon the prevailing economic, sociological, religious, and political climate of the day.

A few examples will serve to illustrate how the arguments used in support of science education have varied from time to time. In the mid-nineteenth century, the English philosopher Herbert Spencer advocated the study of science on the grounds that scientific knowledge was more useful than the other types of knowledge. Scientific knowledge, Spencer said, contributed more than any other subject to the all important human needs of self-preservation and maintenance of health.[5]

During the latter part of the nineteenth century, it was popular to advocate science, or any other subject, on the grounds that it promoted mental discipline and proper moral attitudes. In one particular instance, the dissection of invertebrate animals was advocated on the grounds that a knowledge of invertebrate anatomy would lead students to a revelation of the attributes of God as the master designer! Today, this argument strikes most of us as being a bit far fetched. But, it was probably quite effective at the time it was first presented before the Massachusetts Teachers Association.[6]

In 1924, the committee "On the Place of Science in Education" of the American Association for the Advancement of Science (AAAS) advocated science because of the importance of scientific thinking and the usefulness of the scientific method as a means to knowledge.[7] Note that the committee did not stress the utility of scientific knowledge per se as Spencer had done earlier.

As a final example, let us consider the Progressive Education Association's 1938 publication entitled Science in General Education. In this publication, the arguments given for teaching science include elements of both the AAAS and Spencerian rationale. Arguments stressed the potential contributions of science courses toward the development of reflective thinking and the acquisition of knowledge pertaining to personal-social relations, personal living, and economic relations.[8]

The inaugural issue of the Journal of College Science Teaching contained an article by Lloyd G. Humphries interestingly entitled "The Curriculum Never Changes--Only the Reasons for Offering it Change." In the article, Humphries points out that Latin and Greek were once widely advocated and studied for utilitarian reasons--utilitarian in that they afforded access to the main body of knowledge in literature, philosophy, science, and the arts.[9] More recently, proponents of the classical languages have urged the retention of these subjects in the curriculum, not because they are useful, but because they are cultural.

It is difficult to reject the idea that there is a considerable element of truth in Humphries' statement. To accept it in toto, however, is analagous to accepting as fact the idea that commercial enterprises can sell the same product or service year after year, decade after decade, simply by attending to advertising.

Product Quality

A second factor of importance in determining success in business is the quality of the goods or services offered. Well managed companies recognize that long-term success depends, to a considerable extent, on the production of dependable, high-quality goods or services. As tangible evidence of belief in the importance of this factor, businesses invest significant amounts of capital in quality control procedures and in research and development (R & D) efforts designed to improve goods or services.

Again, if we regard science education as a business specializing in an educational service, we must ask ourselves: "What measures have been taken to insure that the units of service (i.e. science courses) are reasonably reliable and uniform?" "What research and development projects have been undertaken?"

Without attempting to respond in great depth, let us consider the question pertaining to quality control. Prior to 1893, science education in American secondary schools had no uniform standards. Science courses varied widely in both content and length. In 1893, the so-called Committee of Ten completed a set of recommendations which, among other things, led to the standardization of the length of science courses.[10] The mention of standardizing the length of science courses may sound more like quantity control than quality control. However, quantitative specifications of products or services fall within the industrial definition of quality control.

At the elementary school and college levels, little has been accomplished in the area of quality control. State statutes and the regulations of accrediting agencies requiring that specified amounts of science instruction be provided have, however, tended to standardize the amount of service provided.

Let us now turn to the question of research and development. It is not uncommon for a corporation, such as General Motors, to spend many millions of dollars in the development and design of an automobile which will become obsolete in a few years. Superficially, this might appear to be an unwise investment of company resources. Experience and company success, however, have proven otherwise.

It would be difficult to cite an enterprise that invests a smaller percentage of its capital resources in research and development than does education. As a subsidiary of the overall educational enterprise, science education is no exception. Education is America's largest public investment. Most states allot approximately forty per cent of their annual budgets to education.[11] The Federal government spends more than seven billion dollars a year on education.[12] Yet, the allotment of a few million dollars per year for educational research and curriculum development is frequently viewed as a wasteful frill! To make matters worse, the recent trend at the Federal level appears to be in the direction of relatively smaller appropriations for educational research and development.

During the 1969-75 period, for example, the total Federal budget grew by 69.8 per cent, while Federal funds obligated for educational research and development grew by only 32.6 per cent.[13] Even this difference does not suggest the decreased Federal commitment to research and development in science education specifically. The National Science Foundation, an agency which supports much of the R & D effort in science education, has actually had a 26.9 per cent net reduction in appropriations during the 1969-75 period.[14]

The Federally sponsored curriculum development projects of the 1960's stand out as the first and only large-scale curriculum development efforts in the history of American science education. Only time will tell if they will be the last. The reduced number of projects receiving financial support from Federal agencies during the past several years certainly does little to improve the prospects for increasing interest in science through improvement of the quality of service offered.

MARKETING SCIENCE EDUCATION: POSSIBLE STRATEGIES

The "Fatalistic" Strategy

The fatalistic strategy is really not a strategy at all. It is merely the acceptance of the idea that the forces that determine popularity and/or academic worthiness of school subjects cannot be anticipated, manipulated, nor

controlled. Consequently, implementation of this strategy requires no action.

The "Advertising" Strategy

The basic dictum of the advertising strategy is that the popularity and perceived worthiness of any school subject can be controlled through proper "advertising." Strict adherance to this strategy would amount to an acceptance of Humphries' aphorism "the curriculum never changes--only the reasons for offering it change." History has shown that this strategy is not necessarily effective over the long haul. There is no subject so basic to the curriculum that it cannot eventually be replaced. Recall that Latin and Greek once formed the core of a good secondary education. On the other hand, there is no subject so limited in scope and importance that it cannot become a core subject. This should be especially clear to those of us who are familiar with how science offerings have evolved from abbreviated elective courses offered primarily in vocational-type schools to full-length, required courses offered by all types of schools at all educational levels. Implementation of this strategy requires that the managers of the science education enterprise arrange for appropriate advertising.

The "Improved Product Quality" Strategy

According to the improved product quality strategy, the key to creating and maintaining widespread interest in any school subject is to insure that every course offered

under the name of the subject (brand) meets specifications of quality and is truly interesting and worthwhile. Implementation of this strategy requires that the managers of science education set enforcable standards of course quality and that they engage in research and development aimed at improving and updating science curricula on a continuing basis.

UNANSWERED QUESTIONS PERTAINING TO THE MARKETING OF SCIENCE EDUCATION

If one rejects the fatalistic strategy as a means of maintaining and improving the acceptance of science as a school subject and accepts the advertising strategy or the improved product quality strategy or some combination of the two, numerous unanswered questions become apparent.

With regard to advertising, for example, what <u>form</u> should the advertising take? Is the traditional form of presenting arguments for science education in the introductory remarks of textbooks and in the reports and recommendations of professional committees enough? Should we not encourage competitive and/or creative activities which attract attention to science programs? Should professional science education organizations sponsor commerical advertisements on television, as does health and physical education, for example?

If we do decide to advertise, who should be the target population(s)? Students? Science teachers? School administrators and curriculum specialists? Legislators? The general public?

If we attempt to promote science education through standardization and improvement of curricula, how shall we raise the necessary R & D funds. Can we obtain them through lobbying efforts at the local, state, and national levels? Are we because of our status as a tax-supported enterprise doomed to an eternal shortage of R & D funds. Will it be necessary or appropriate for our professional organizations to sponsor fund-raising drives to promote R & D projects in critical areas?

MARKETING SCIENCE EDUCATION: A SUGGESTED STRATEGY

Any proposed strategy for promoting science education is likely to receive something less than the unanimous support of the science education community. This is only natural, since any proposal must necessarily be based on subjective factors such as the analysis of social, political, and economic trends; the examination of curricular trends from a historical perspective; and the experience and intuition of the individual proposing the strategy. Therefore, the following strategy is suggested with the understanding that many will disagree with it and, furthermore, are justified in doing so.

The strategy which I would propose would seek to improve acceptance of science education through better use of "advertising" and improved "quality of service." The emphasis would be on the former as a means to achieving the latter.

IMPLEMENTING THE STRATEGY

As mentioned previously, advertising in education frequently takes the form of a rationale presented in a textbook or committee report. Recent advertisements seem to have fallen into a pattern of emphasizing the contributions of science on the development of basic mental functions while ignoring the utility of scientific knowledge per se.

The 59th Yearbook of the National Society for the Study of Education stressed the dependence of society on science and emphasized understanding of the nature of science and the development of problem solving skills as major goals of science instruction.[15]

In its position statement on science education for the '70s, the National Science Teachers Association indicated that the value of science lay in its ability to develop ". . . scientifically literate citizens with the necessary intellectual resources, values, attitudes, and inquiry skills to promote the development of man as a rational human being."[16]

It is apparent that the preceding advertisements stress the potential of science to promote the development of general intellectual qualities and skills rather than knowledge of particular facts and theories. They are reminiscent of the advertisements put forth by the proponents of the classical languages in the nineteenth century. Advocates of the classics argued that the study of Latin and Greek strengthened general mental faculties and were important

not because of content per se. but because they trained the memory, developed appropriate attitudes and values, and cultivated good judgment.[17]

The managers of science education should be alert to the fact that the arguments of the classicists were ineffective. The classics were gradually phased out of the curriculum and replaced by the sciences--subjects which were justified primarily on utilitarian grounds by Spencer in his persuasive essay entitled: "What Knowledge is of Most Worth?"[18]

Let us now refocus our attention on a goal which the managers of science education have long striven for; that is, the goal of improving the quality of service offered. As indicated earlier, finances are the key to improving quality of service. Without sufficient funds for R & D, modifying and revising science curricula to meet the ever changing interests and needs of our customers will be difficult, if not impossible.

If the key to improved service is increased funds for R & D, the logical follow-up question is: "What is the key to increased funds for R & D?" Aside from obvious factors such as the state of the economy, the answer would appear to be demand--demand from the general public and demand from science educators as a special interest group. Here again, advertising plays the key role. Public demand for any school program is likely to be determined mainly by how "sold" the public is on the program in question. Since

it is obvious that advertising plays an important role in determining the degree of acceptance of school subjects, several recommendations regarding advertising are in order.

* Future advertising should stress the utilitarian as well as the general benefits that accrue from the study of science. It is important that benefits of scientific knowledge per se be emphasized and that we not repeat the mistakes of the classicists I have elaborated on this point in some detail elsewhere.[19]

* Whenever possible, future advertising should be conducted in such a way as to promote science in a subtle way, rather than by using a "hard sell" approach. For example, a well-publicized science fair would constitute subtle advertisement; whereas, a brochure describing the importance of science education and distributed to parents at, say, a school-wide open house, would constitute a "hard sell."

* Future advertising should attempt to promote the image of science as a subject for all ages, races, sexes, and intellectual abilities. At present, the image is much too academic and, hence, is unattractive to average and below average students.

* Future advertising should be directed primarily toward educational decision makers. As mentioned previously, advertising has historically been transmitted through committee reports, special studies, and through textbooks and other curriculum materials. The target group of such advertising includes, of course, the readers of these materials--primarily students, teachers, and university science educators. These individuals seldom have major decision making responsibility. Consequently, advertisements need to be disseminated in such a way as to include school administrators, curriculum specialists, legislators, and others in decision making positions. This may necessitate the development of new dissemination techniques or the more effective use of present ones. In

addition to the use of printed materials. possibilities for using visual media, specially designed inservice programs and workshops, and the use of professional lobbyists should be explored as ways of reaching educational decision makers.

In addition to the above suggestions for improving advertising, there are numerous other suggestions which, if implemented, might help to improve the image of science and aid its acceptance as a curricular offering. Some of these include:

* Establishing an accrediting association for purposes of recognizing and honoring elementary, secondary and collegiate programs that meet specified standards of quality. The accrediting association could be an existing organization, such as the National Science Teachers Association, or a new association could be founded. The anticipated effect of such an accrediting association would be to stimulate and encourage institutions to strive for, and maintain, high-quality science programs.

* Treating controversial subjects, such as birth control and human evolution, in a low-key, unobtrusive manner so as to avoid adverse reactions and publicity.

* Systematically identifying, perhaps through local and/or national surveys, areas which are, or may be expected to become, subjects of widespread student and/or public interest.

* Developing of regional, national, or international centers for research and development in science education. Such centers should be equipped and staffed to respond rapidly to newly identified consumer interests and demands. A serious current problem in materials development is the length of time between the identification of new consumer interests and the availability of new materials. Take ecology, for example. By the time new curriculum materials pertaining to ecology became available, interest had already started to decline. For this reason, efforts must be made to reduce the turn around time between identification of new interests and the availability of new materials. Also, efforts must be made to learn to predict future needs and interests.

SUMMARY AND CONCLUSION

Enrollment in science education has come a long way. In 1890, only about 360,000 students were enrolled in secondary-level science courses; but by 1974, estimates of enrollment ranged upwards of 15,000,000.[20] Yet, there is reason for concern and room for improvement in science enrollments.

We must recognize that science still ranks behind most other major subject areas in enrollments. According to recent statistics[21] science currently enrolls fewer students than either mathematics, the social sciences, health and physical education, or English. In percentage increase in enrollments during the 1960-1972 period, science was badly outstripped by foreign languages, health and physical education, and English.[22]

It is difficult, if not impossible, to predict what the future holds for science education. Nevertheless, it is the duty of the science education community not to leave the matter to chance. We must at least attempt to control our own destiny. To do this, we must give careful attention to the marketing of our subject.

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